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EDUCATION IN TURKEY.

THE basis of all Mussulmaun education is the common endowed school, either attached to a mosque, or being in a separate building. Generally, whether in Constantinople or elsewhere, the school is small, having a schoolmaster, and perhaps a pupil-teacher, or assistant, and from twenty to fifty scholars. The school-room is generally small, and mostly in an upper story, occasionally over a sebil, or drinking-fountain. The schoolmaster is a member of the ecclesiastical body, holds a recognized station in society, and is treated with consideration. He is paid from an endowment, the presents given by the children being very small, and so far as they are concerned, education may be considered free. There is nothing to prevent any Mussulmaun child in Turkey, boy or girl, from receiving education, and there are statutory enactments declaring the schooling of boys to be obligatory. Turkey, therefore, is one of the countries in Europe having a free national education. State assistance is limited chiefly to the supply of improved educational works, and these are supplied on demand to schools of all denominations.

This is a proper place to state that there is a Minister of Education, and that the department, generally united with the Ministry of Commerce or Public Works, has been held since its institution by patriotic and enlightened men, of whom may be named Kemal Effendi, Ismael Pasha, Safvet Pasha, and Edhem Pasha, the present minister. There is a regular department, under which all the public establishments are placed. As a general principle in Turkey, where the State grants assistance, the establishments are open to its subjects of all religious denominations; but the general basis is the voluntary action of each denomination or nationality. What the State grants to these, is, permission to acquire lands and grant endowments in mortmain for schools; and generally it fosters all applications for assistance. There is no State system of education forced upon any school, and the Mussulmaun, Jew, Armenian, Greek, Roman Catholic, or Protestant, conducts his school just as he likes, without any interference.

This freedom of education is one of the many liberties enjoyed in Turkey. Of course, it is not without alloy and not without defects; but it will generally be found that alleged cases of arbitrary conduct or oppression towards Christian schools, do not implicate the character or principles of the Government. For instance, a missionary succeeds in inducing a Turkish proprietor to let or sell him a house for a school in a Turkish quarter, and the Turkish inhabitants, as they have a perfect right to do under the system of frankpledge, refuse to allow the house to be so used; or an attempt is made to set up a school for the conversion of Jews, in a Jewish quarter, when the Jewish inhabitants refuse their consent. The parties, after vain attempts, have generally to set up their schools in some Christian or mixed quarter, where there is no objection or no regulation in force.

The children in the common schools, are—the girls from four years old to twelve or thirteen, and the boys from four or five to fourteen or fifteen. Some of the younger scholars are undoubtedly sent to

school to be kept out of the way. Notwithstanding the requirements of the Government, a large proportion of the population is not educated. The Kizzilbashes, or sectaries of Ali, the Gipsies, and many of the nomades, are uneducated; so, too, with the Mussulmaun Albanians, and Mussulmaun Koords, whose Mussulmaun profession is of a very loose character. With all these populations, except Turkomans, the Turkish is a foreign and official language. In the island of Candia, the Mussulmauns commonly speak Greek; and many cannot speak Turkish, or if they do, they learn it abroad. On the other hand, the Greeks of Asia Minor, particularly the women, speak Turkish and not Greek.

The lower classes, as a general rule, do not send their children to school. For such writing and correspondence as they have, a public writer is sufficient; and their post-letters are taken to the writer to be read, and, if need be, answered; and, it may be observed, letter correspondence, by post-office and carrier, is carried on extensively. The trading classes generally send their boys to school, but the girls are only partially sent. The clerical and official classes, who value education most, send their children, unless they have a governess at home for the girls, or a teacher for the boys. There is no distinction of rank, and, in the villages on the Bosphorus, the son of a Pasha may sometimes be found in the common school by the side of the black boy. The Rushdiyyeh schools are, however, now drawing away the higher classes.

The common schools are still mainly under the direction of the clerical functionaries, and the Government has not yet succeeded in impressing them or the public with the importance of improved education. Notwithstanding the efforts made, it may be stated as a general rule, that the schooling consists of long and close drilling in reading and writing the various characters or handwritings, but chiefly the Arabic, and in acquiring the ceremonial drill of religion.

The schoolmasters are very proud of their handwriting, and a corresponding reverence is communicated to all classes of society. Elaborate writing is truly a profession, and includes many practitioners, writers of State documents, law-writers and stationers, schoolmasters, and traders in inscriptions. All classes, to the smallest shopkeeper, consider it a duty to encourage inscriptions, which are esteemed as choice works of art, and have a religious and mystic, or magical virtue. Thus the house is insured against fire, not by the badge of an assurance-office, but by an inscription in a mystical form, of "Oh! (God the) Preserver," while in the inside of the shop may be "Mashallah," wrought into the form of a pear, the great name Allah Hoo in a double shape, the creed of Islam, the name of the prophet, and the name of the owner. Sometimes are to be found the emblems of the Dervish order, of which the person is an affiliated member. Thus, handwriting is carefully taught and cultivated, and one of the late sultans practiced it as his household trade. In the wealthiest houses may be found illuminated and framed verses and texts, and the schoolboy is seen going home daily with his copy-book, for the delight of his father, and the admiration of his mother and her slaves.

As it was formerly in our law-courts and offices, and lately in India, each department has its own character or court-hand, and, as the uninitiated can not readily decipher them, a knowledge of them is in itself a profession and a livelihood, and a great incitement to their acquisition.

As to the amount of other practical knowledge communicated, it is very small; the more learned the schoolmaster, the less being the probability of his condescending to impart profane knowledge; and the more the attention he has paid to theological subjects, the less has he given to historical or scientific subjects. His notions of geography, and astronomy, and natural history, are subordinated to old fables, and to the universal belief in astrology, alchemy, and magic. Perhaps the schoolmaster himself may be sufficiently advanced to be a practitioner of these latter arts. Sometimes his next-door neighbor is the learned Maghrebi, or black, who has in his window choice horoscopes and schemes for interpreting the stars in conformity with Holy Writ. Not

far from the Ministry of Public Instruction, at Stamboul, is a fortune-teller and discoverer of stolen goods, whose house is daily besieged by hundreds of men and women, white and black, who may be seen occupying the adjoining pavement in crowds. Not far off, are male and female healers of all diseases, by mystic touch and repetitions of charms.

The schoolmaster is the great teacher of manners and morals. This is one great part of his vocation; and these are branches of education, in which his scholars, male and female, are duly drilled. They are prepared for all the duties of society, from the first prayer in the morning, to the reception of a friend or guest. There they learn those salutations which become graceful, because, by long practice, they are almost instinctive. There is a tale of one learned man, who was a sufferer by his assiduous teaching. His scholars had been trained to make the *temenna* on all suitable occasions—when he entered, when he rose, and even when he sneezed. It so befell, that the bucket of the well in the school-yard fell down, and after the scholars had vainly essayed to recover it, the master himself descended, the worthy Hojah hanging on by the rope. When brought to the surface again, with the recovered bucket, from wet and shivering he sneezed. Thereupon the well-mannered and well-trained lads, as in duty bound, simultaneously raised their hands to their breasts, lips, and foreheads; but as they let go the rope, their reverend preceptor tumbled down to the bottom again. In the country, the village Hojah unites a variety of functions—schoolmaster, letter-writer, conveyancer, registrar, preacher—and is occasionally the only man who can read a document or carry on a correspondence.

The Government has published a number of improved school-books, on geography, arithmetic, &c., of which Kemal Effendi was one of the first authors, and these are being gradually brought into use, and with more success of late years. It will take time, however, before this improvement can be carried into effect throughout the empire, for, as in many other things, the Government is more advanced than the people.

Another main point with the Government has been to improve the schoolmasters; but in this it has met with no support from the Ulema. Nevertheless, the improved school-books have borne their fruits, but particularly in the advanced schools; and every year, from among the Ulema themselves, is coming forth a body of better-informed teachers. These, however, are taken up at once for the Rushdiyyeh schools, and other public establishments. The Government has failed, as yet, in obtaining the appropriation of any part of the endowments of the Medressehs and their scholarships for improved education; but the time is near at hand when this will assuredly be effected, because the alterations of prices are so seriously affecting many religious endowments, that the professors will be very glad to accept public aid under an improved administration of ecclesiastical property by the State—an impending measure.

The number of Mussulmaun common schools in the Constantinople district, is 280; and of pupils, boys, 9,975; and of girls, 6,782; total, 16,757. Adding to these the Rushdiyyeh schools, would make the total about 20,000; or an average of 1 scholar in 20, or of boys, 1 in 15, of the population, exclusive of private schools. Of Greek schools, there were 77, with 6,477 boys; of Armenian, 37 schools, with 6,528 boys; of Roman Catholics, 8 schools, with 509 boys; of Jews, 44 schools, with 2,552 boys; of Protestants, 5 schools are enumerated. The girls in these schools are not returned; but the proportion of boys will be about the same as with the Mussulmauns, but of girls much less.

Besides the common endowed schools, there are numerous private schools kept by Hojahs, and chiefly frequented by boys of the mercantile class. Here, arithmetic, book-keeping, and correspondence, are taught. There are no such schools for girls; as the higher education for girls, when required, is given at home.

The chief success of the Government has been with the Mektebi Rushdiyyeh, answering to our grammar schools, and communicating improved instruction. Of these, there are now 48, being 1 in each chief town of the empire, with 3,125 schol-

ars; and 12 in Constantinople, with 3,271 scholars. Of girls' Rushdiyyeh schools in Constantinople, there are 10, with 1,125 scholars.

In the Rushdiyyeh schools, there are, where practicable, teachers of French and of drawing. The Rushdiyyeh schools are more developed in Europe than in Asia, there being 34 in Roumelia, and 14 in Anatolia. There are constant applications for these schools, and the pupils appear to value the instruction. The sons of official employees, and youths aspiring to employment, are those who chiefly enter.

MY OLD TEACHER.

HE used no paper cap to mark the fool;
He never docked our play-hours of a minute;
No marks recorded lazy boys' demerits;
There was the hour at which began the school,
And he was there all ready to begin it;
Each fault that met his eagle-vision had to bear its
Due punishment; relentless man,
Stern in his manner, quick with his rattan.

That slender, yellow rod, strong and elastic,
That played like lightning often in our rear,
As I, and many another, could avouch—
(Birches he never used, or to the last stick
He would have worn them) often, filled with fear,
And sometimes pain, and uttering wildly—"Ouch!"—
(A word not found in dictionaries) we,
Where all was dark at first, made out to see.

A stern persuader, that rattan, and often
We planned to hide or burn it; but in vain.
Had we succeeded, little were our pleasure;
For did it break, its loss would never soften
His rigid purpose, or relieve our pain—
The new one always was of larger measure—
And hence we bore our ills, rather than fly to
Others much worse than those we'd bid good-bye to.

And yet he taught—he had the power to teach,
Which not all teachers have—he made us know;
Whate'er he did, was well done and with care;
In all our tasks, he saw we mastered each,
And never let our right foot upward go,
Unless the left was firmly planted where
He had directed—what we knew, we knew;
It did not vanish, like the morning dew.

We feared, and yet we loved him—feared his wrath
At faults of ours ; and loved the pleasant smile,
Which, when we zealous strove, his features bore ;
And if, in leading us along the path
To truth and knowledge, he was stern the while,
'Twas not he loved us less, but learning more.
Green be the grave wherein he sleeps for aye—
Green be his memory to our latest day.

IDEAS FROM NEW BOOKS.

DR. COLLARD, in his "Practical Hints," has the following, which is worthy the attention of teachers:—

"Amongst the devices now used in schools for keeping children well employed, saving time, and preventing copying, may be mentioned the following:

"*In Arithmetic.* (1) *The use of arithmetical cards.* A class is working, say, multiplication by one figure. The teacher of the class is provided with a set of 40 or 50 small cards, of the size of a lady's visiting card, on each of which are four or five examples in this rule, numbered, all differing from one another, and from those on any other card. The teacher has also by her a larger card, on which are written the answers of all the sums, with corresponding numbers. When the children are ready to begin, each has a card given him, and, on being told to commence, sets to work with the examples upon it, the teacher meanwhile helping one or two of the more backward children. Upon a child's finishing his card, he holds up his hand, reads the number of the first question and its answer; the teacher says whether the result is right or wrong. If wrong, the error is pointed out, and the sum must be done again; if right, the next answer is read out, and so on. When all the examples on a card have been done correctly by any child, the initials of his name may be written on the back of it in pencil, that he may not have the same card again.

"In this way a large class, engaged in two or three different rules even, may, with the help of as many sets of cards, be easily kept thoroughly employed, and that without the possibility of copying. Cards of the kind described can be bought printed, but it is strongly recommended that every teacher makes his own. On each card, half the examples might be with abstract numbers, and half with concrete ones, in the form of simple problems: such questions as would be quite within the comprehension of the children, and would interest their parents when the cards were taken to be worked at home.

"The examples should gradually increase in difficulty, from No. 1 upwards.

"(2) *The setting of several sums on the blackboard* for distribution among the children, no two children doing the same sum at the same time. A class is working subtraction of money, say. The teacher writes on the blackboard, *before* nine o'clock, some six examples; numbering them 1, 2, 3, 4, 5, 6, respectively. When the lesson commences, the first child says 'one,' the next 'two,' the third 'three,' and so on. Then, on being told to begin, each one takes the sum marked with the number just repeated by him. When the child who has had No. 1 has finished, then 3 and 5 are taken; when 2, 4 and 6; after 5, follow 2, 4, and 6; and after 6, 1, 3, and 5. The object of this arrangement is to prevent any two contiguous children having the same sum. On a sum being finished, it is *brought* to the teacher; and if right, *at once obliterated;* if wrong, done again.

"As in the other plan, the teacher has the answers of the sums given on a piece

of paper before her, and, as opportunity permits, gives individual assistance where most required. Occasionally, too, in both plans it will be necessary, when the same example has been done several times wrong, to examine the working, and detect the cause of the mistake.

"A quick way of *setting* sums on the blackboard, and which takes less room than the ordinary plan, may here be mentioned. In the case of multiplication, write down one multiplicand, and by the side of it several multipliers; in division, one dividend and several divisors; in addition, if the sum on the board consist of six lines or so, let the first child, in copying it down, omit the first line, the second the second, and so on; and in subtraction, one minuend may be made to serve for several subtrahends. Of course, the teacher should have ascertained beforehand the answers to the several sums.

"(3) *Letting the children stand back to back.* If at any time it is thought advisable for the children all to do the *same* question (one, perhaps, which the teacher has previously carefully explained), then copying may be rendered *almost* impossible, by the children's saying, 'one,' 'two,'—'one,' 'two,' round the class, and, at the word of command, standing in pairs, back to back. A little practice will make them ready enough in doing this.*

"Occasionally, the teacher may find it useful to set sums, the answers to which can be seen by inspection. For helps to this, see Tate's First Principles of Arithmetic. In addition, at least, there is one plan, which is certainly very practicable. In the following example (and such a sum can be set as quickly as any other addition sum), that the answer is in the third line, and why it is, are readily seen:

2564
7436
1715
9243
757

21715†

The line containing the answer, may be put anywhere, and had better seldom occur more than twice in the same position.

"*In Dictation*, time may be saved, and the children kept well employed, not only by the means already suggested, but also whilst the mistakes made are being corrected, in other ways. There are always some children in a class who have made no mistakes, or only one or two, and who, consequently, want employment, whilst the others (some perhaps with six or eight errors apiece) are writing each word out correctly five or six times. Let such, then, as have no mistakes, write out:

"(*a*) The passage dictated on the order side of their slates from memory: or

"(*b*) Something they have recently learnt by heart: or

"(*c*) The meaning of half a dozen of the words: or

"(*d*) Explain the difference between 'here' and 'hear,' 'there' and 'their,' &c.: or

"(*e*) Fill up elliptical sentences, previously written on the blackboard, such as

'He — earnestly, and so — — progress.'

"Of course, after any thing of the kind has been done, the slates must, *at least*, be glanced over, or collected and looked at, by the teacher after school.

"It need scarcely be added, that the *great means* to be trusted to for *preventing copying*, especially in dictation, must be the *moral element*. If a child is early accustomed to his teacher's regarding and treating copying as a species of untruthfulness—if he knows that when copying is detected, the book or slate of the offender will certainly not be looked at—he will undoubtedly (supposing his teacher's good opinion is really cared for) acquire the habit of resisting the temptation. In a school in the neighborhood of Salisbury, well known for its high tone in this respect, this is the chief means employed for securing it."

From "Notes on Lessons," we take the following paragraph:

"Important as the preparation and arrangement of lessons are, the method of presenting them to the children is not less so, and requires equal care and study. In-

* [We object to this back to back business. It shows a distrust of the children, which itself invites them to deceive. —Ed. Am. Ed. Monthly.]

† The sum of lines one and two, consists of *a one, with so many noughts*; the same is the case with the sum of lines four and five: consequently the sum of the five lines will be *two, with the digits in line three.*"

formation may be nicely put together, the lesson may be well arranged, but more is needed to make it effective;—the manner in which the youthful mind is to be exercised upon it. In considering the science, character, and object of questioning, it is not my intention to enter into a critical disquisition on the various modes or systems of questioning; every teacher has, in a great measure, a system of his own, adapting some method to his own peculiar views and circumstances: my object will be fully accomplished, if I confine my few observations exclusively to the above-named divisions. A blind adherence to any system of questioning, however good, can not be productive of permanent benefit. There is no doubt that many of the systems at present used, possess good points, and also many defects; and it should be the teacher's object to select those parts best adapted to his own capacities, and the circumstances of his school. The term Education is compounded of two Latin words, *e*, 'out of,' and *duco*, 'I lead or draw,' and consequently should, in its intellectual signification, refer to some such process of drawing out some latent qualities, and extending and expanding them. Now if we connect to this, the *science* of questioning, we shall see that the human mind is, as it were, a huge storehouse, containing vast accumulations of ideas and facts, capable of being brought into operation by catechising, which may very appropriately be considered as the key for unlocking this storehouse. It appeals to the mind, and brings into exercise the reflecting faculties, testing the capacities of children, and supplying their wants. This is pre-eminently the teacher's vocation, not to state facts to passive minds, but, by questioning and explanation, to allure the mind of each scholar to unfold itself, and display its hidden powers. The plan which Dr. Arnold adopted, explains the *science* of questioning so clearly, and is so admirable in its character, that it is worthy of being carried out by every one engaged in the education of the young. 'His method was founded on the principle of awakening the intellect of every individual boy. Hence arose his practice of teaching by questioning. His explanations were as short as possible, as much as would dispose of the difficulty, and no more; and his questions were of a kind, at once to call the attention of the boys to the real point of every subject, to disclose to them the exact bounds of their knowledge and their ignorance, and to cultivate in them a habit, not only of collecting facts, but of expressing themselves with a facility, and of understanding the principles on which these facts rested. You come here, not to read, but to learn *how* to read; and thus, the greater part of his instructions were interwoven with the process of their own minds; there was a continual reference to their thoughts—an acknowledgment that, so far as their information and power of reasoning could take them, they ought to have an opinion of their own—a working, not for, but with the form, as if they were equally interested with himself in making out the meaning of the passage before them—a constant endeavor to set them right, either by gradually helping them on to a true answer, or by making the answers of the more advanced part of the form, serve as a medium through which his instructions might be communicated to the less advanced part.' Such was the system which this eminent schoolmaster practiced; he lived to see the superiority of his methods of teaching, in the successful management of a large public school. Without digressing from the subject under consideration, the following hints will, it is hoped, prove useful. In giving a collective or an object lesson, the plan generally recommended, is, to present to the children a correct and perspicuous description or account of the subject under consideration, in the form of a short lecture, embracing as concisely as possible every particular connected with it, after which they are to be questioned on it, in order to show the real extent of what they have acquired. In Reading Lessons, the following method will, I think, present many advantages. While the class is reading, the teacher will pay attention to the tone, punctuation, accent, and correct expression of the text, and will also put such inferential or suggestive questions as the lesson supplies, together with the explanation of any difficult words or passages which may occur. Then, when

the reading is finished and the books are closed, questions may be put of a self-evident character, from the lesson. The former will furnish the children with fresh information, and test their general knowledge, while the latter will afford the teacher a fair criterion of what they have really remembered."

The following, on the Abuse of Paraphrasing, we take from the first book of "Wordsworth's Excursion, with full Notes," by the Rev. C. H. Bromby:

"It is necessary to guard the pupil, and perhaps in some cases the teacher, against the abuse of paraphrasing. The following suggestions may prove to be useful. No new *thought* must be added. The author's meaning must be thoroughly mastered, and then expressed, sentence by sentence, in the paraphraser's own words—omitting nothing, adding nothing.

"The paraphraser need not change one word for another for mere change sake, as in the paucity of English synonymes such a change can seldom be made without injury. Where, however, the author is dark, he may be more explicit: he may fill out what is left incomplete in the structure of the sentence.

"In poetry, especially, he is at liberty to reclothe, in prose dress, a passage which he has stripped of the diction proper to poetry. He should invert sentences and place them in more natural order, and expand either sentences or thoughts which were left only suggested. Take, for example, Pope's line:

'Man never is, but always to be, blest.'

The simplest paraphrase would be: 'Man never is truly happy, but he always hopes to be so at some future time.' More fully, the thought would be expressed: 'No man at any time will confess that he has attained the blessedness of which his nature is capable, but he never parts with the confidence that the time is coming when he will.'*

"The paraphraser must be careful to adopt the following general rules:

"1. He must not add to the thoughts of the writer.

"2. He must not change words, or the order of thoughts, except to make the meaning more plain than in the original.

"3. The figures and metaphors may be changed for literal expression, if the severity of prose requires it, and the force of the original will not be injured.

"4. The principal thought must still be principal, and the subordinate must still be subordinate.

"5. No change must be made for the sake of change.

"6. Simplicity, without dilution, must be the one single aim."

GEOGRAPHY ENFORCED BY HISTORY.

THAT a thorough knowledge of history can be acquired at school—that the mind of a child can be made to truly understand the deeds of the actors in the great drama of the world, or comprehend the motives of the famous statesmen flourishing at various epochs—is so absurd as not to be seriously held by any man. Hence there is no attempt to impart complete historical knowledge to the schoolboy. But the English, and after them the American schools, have fallen into the opposite error. They rarely endeavor to teach what they should teach, namely: the salient points of history—above all, that of their own countries. They should impart—and we now confine our remarks to schools in the United States—a knowledge of the early settlement, the general progress and relative importance, and a knowledge of the formation and the growth of the Union of the several States. A rudi-

* As an instance of paraphrasing, this may do. A system of condensation is more needed. Pupils should be taught to take expanded paragraphs, and express the ideas in fewer words. The great fault of our modern writing is its verbosity.—Ed. Am. Ed. Monthly.

mentary knowledge of all this should be insisted on, and it should be taught in that methodical but interesting way, that will make the pupil desire to know more for himself, and enable him to read history with pleasure. And in teaching history, you may enforce, in a repetitive manner, the leading facts of other studies. Geographical facts are especially to be impressed upon the mind in this way.

In connection with this, we remember a system pursued by a teacher of note, which we intend to speak of, partly because it has a degree of merit, and partly because we desire to provoke comments upon the matter by experienced teachers, to whose views and ideas upon practical things, our pages are always open.

The teacher of whom we speak, used an ordinary History of the United States, as a text-book. Thrice a week, a short passage of the work was thoroughly learned by the pupils, who were required to give, in their own language as far as possible, the sense of what they had studied. When this had been done, a series of questions, interlarded with instruction on collateral matters, was indulged in.

The summary of a single lesson, will give a clear idea of the course pursued.

The subject was the surrender of Cornwallis at Yorktown. So soon as the class seemed to have comprehended the facts and details of the surrender, the geography of that section of Virginia was brought to their consideration. A large map of the State was suspended on the wall in full sight, and each pupil's atlas was open before him, at the corresponding map there. The questions then were put, without regular rotation as to pupils, somewhat in this wise:

1. Where is Yorktown situated?
2. What was the population and general character of the town at the time of the surrender?
3. What was its population in 1860?
4. What is the general course of the York river?
5. What is the character of the stream?
6. What counties does it drain?
7. Name its principal branches.
8. What is the general course of the James river?
9. What is the character of the stream?
10. What counties does it drain?
11. Name its principal branches.
12. What towns are on the York river?
13. What on its branches?
14. What towns are on the James river?
15. What on its branches?
16. Give the population of those towns at the last census.
17. What is the distance between the two rivers at Yorktown?
18. Why is the ground between the two rivers called the Peninsula?

As each question was answered, the teacher corrected errors and supplied defective information. After this, he gave a rapid but clear description of the character of the Peninsula, its soil and productions; spoke of the stratum of shell-marl which underlaid it, the consequent badness of the well and spring water, the use of cisterns, the prevalence of disease during the months of August, September, and October, the scale and shell-fish found in the adjacent waters, and other points of interest. The questions were then resumed:

19. You have named some towns on the James river. What two of these are distinguished for their manufactures?
20. Name the principal articles manufactured at Richmond.
21. Why does the Richmond flour command such a high price in the New York market?
22. What seaport is at the mouth of the James river?
23. What is the name of its harbor?
24. What fortifications are there?
25. What is the distinction between a fortress and a fort?
26. What government works are near Norfolk?
27. What is a navy-yard?

And so the subject was continued until exhausted, correcting erroneous views in the pupils' minds, and adding collateral facts as occasion arose. Much of this was doubly repetitive, for a portion of it had been gone over previously, when the action of the Provincial Assembly at Williamsburg had been under consideration; but it was none the worse for that.

In the same manner, the battle of Bunker Hill, the fight at Lexington, the battle

of Brandywine, the capture of Andrè, the contest for the charter in Connecticut, the battle of the Thames, the signing of the Declaration, Fulton's application of the steamboat, and other salient points, were in their turn examined and discussed; and the general facts in geography, natural history, and philosophy, impressed indelibly upon the pupils' minds. It became a matter of amusement and interest to them, looked for thrice a week anxiously; in seeking the answers to the special questions, they picked up more facts, that came readily to their minds at future lessons; and they acquired a love for the studies thus touched on, and a thirst for the acquisition of knowledge, not to be had by other means. How far a plan of this kind, under proper modifications, could be extended to the public schools, where there are a large body of pupils, is a matter for consideration. In the smaller private schools, and in the higher academies, it is quite practicable. The greatest objection might be—the lack of a good school history of the United States. A gentleman of literary distinction is engaged now, however, in the preparation of such a history, specially designed to be used in this peculiar kind of instruction, though also fitted for the ordinary mode. Such an objection will not, therefore, be long tenable.

RAN ADKINS.

I DID not enter into school-life by way of the clock-peddler's cart, as some people seem to think all the old-fashioned schoolmasters did. I made my advent among teachers in a very humble way, however. I began in a field schoolhouse, one badly built at that, in the hilly region of Western Virginia. I was never specially educated for the profession. There were no normal schools in those days. A wandering teacher would come along, generally from New England, and the neighbors would club together, and send him a sufficient number of pupils. He would teach for a year or two, take up a bit of ground, indulge in speculation and quarter-racing, range a few cattle in the neighboring hills, get well-to-do, and then abandon his school to a new-comer, or to itself. In that way, the "rising generation" had the taste of a variety of teachers, and a touch of various systems of instruction. All the latter were based, however, on the knock-down and drag-out plan. A teacher was considered most excellent, who could flog the whole school into subjection in a month; but he who managed to terrify the little boys and thrash the big ones, on the first day, was a pearl of great price, indeed.

I was born in that section, and was well-acquainted with the manners and customs of the sturdy mountaineers. When about eighteen, I went to Baltimore, in company with some drovers, liked the place, got an inferior situation in a warehouse, and remained there for three years. While there, I picked up a variety of accomplishments. I could smoke the most villainous tobacco without the least damage to my nerves; in euchre, I had the degree of doctor, by general consent; and a professor of the manly art of self-defence, whose heart I won by my faculty of always dealing to myself both bowers and the ace, taught me how to use my fists after the manner of the late lamented Yankee Sullivan. But a yearning for the green forests and clear streams came over me, and I returned to my native county, where I obtained a place as clerk and salesman in a country store, at the county-town, called as all the shire-towns are in that section, "the Court-house." In that responsible position I flourished exceedingly, for a time.

But my good fortune did not last very long. About six months after my arrival, the firm of Skinner & Cheatham, general dealers, gave way, and became any thing but solvent. The partners had a large confidence in human nature, and the goodness of mankind in general, which that portion of human nature and mankind there resident repaid but illy. Every-

body, or nearly so, was in debt to them, and nobody paid. As the firm had started without capital, it had a capital failure. There was another storekeeper in the place—Andrew Schwindler—but he was his own clerk, and wanted no aid. There I was, about the beginning of winter, without a situation, and possessed of capital health, and ten dollars, forty cents. "Something or somebody had to be done," as some author with lax notions of morality, puts it. What, or who? was the question.

A bright idea came. I will teach school.

The last teacher had left a month before, carying with him a black eye, as a token of regard from the biggest boy in the school. No one had mustered courage to take his place. The mass of the pupils might indeed be managed, by force or stratagem; but there was one, who was more untamable than the wild horse of the desert. Randolph Adkins—familiarly known as Ran Adkins—was the Mordecai to the Hamans of the rod, the terror of pedagogues, Lord of Misrule, and chief Cock of the Walk.

I had, however, no particular terror of Ran Adkins. He and I were firm friends. He was a stout, strapping boy of nineteen years, with all the thews and sinews of a man of thirty. He could jump farther, run faster, and lift a greater weight, than any one for twenty miles around. He was not a promising scholar, being only able to read by skipping the hard words, and after having attended every school opened for ten years, could only cipher as far as long division. He would have done better, but for a theory. He took it into his head that no teacher could do him any good, unless he was able to pound him first. As Ran—whose father had let him grow up like a wild colt—was plucky and stout, for five years no teacher had been able to take the necessary first steps, and the acquirements of the junior Adkins had not increased. I had no fear of him, however, partly because he and I were good friends, and partly for another reason, to be revealed in the sequel.

I announced that I would open school on the Monday following. The next day, which was Saturday, Ran waited on me in person.

"See here," said he; "are you gwine to keep school?"

"I am, Ran."

"Well, hold your hosses. It's a resky business. Ther's some pooty bad boys that'll come, and you'll git licked afore ye know it. You've got a heap of book-larnin up thar in furren parts"—Baltimore was considered foreign in that section—"but it won't do."

Ran did not mean that the learning wouldn't do, but the attempt to keep school.

"Oh," said I, "that'll be all right. There won't be any one there that you can't whip, and you must help me through."

"It can't be did!" was the emphatic answer. "Round yer, it's all right. Ef any chap was to tackle you, I'd pitch in sudden; but no man kin larn me anything that don't lick me fust; and I reckon you dont think you kin lick me."

I had my own thoughts on that matter, but I kept them to myself.

"Well," said I, "I'm sorry, Ran; but I've promised, and I intend to keep my word. If we two do have a fight, you must fight fair."

"I'll do it," cried Ran, his eyes brightening; "nary gougin', nor hittin' when yer down, but a fair, stand off affa'r. But ye'd better go to somethin' else."

I shook my head. Ran endeavored to persuade me to renounce my foolish intention, but in vain. He left, at length, with a mournful air. He liked me very much—he had a great admiration for my many good qualities; but it was a point of honor to whip the schoolmaster, and before his sense of his duties as a public character, his feelings of private attachment gave way.

Monday morning came, and the school children gathered together. A very healthy, honest, and ignorant set they were; with quick perceptive faculties, generally, and good material for fine men and women. But they did not come as participants in school exercises on that morning. They were there as spectators. It was understood that Ran Adkins was to

"lick" the new master, and they were there to witness the pleasant and improving spectacle.

So soon as nine o'clock arrived, the little hand-bell was rung as a signal, and the pupils entered, with Ran at their head, and took their seats. I explained to them how I expected them to behave, and what I wanted them to do; and after examining them each briefly, I arranged them in classes. Ran I left to the last.

"Now," I said, "I am about to examine you, Randolph Adkins, in order to see where I shall place you. Come up to the desk."

"It can't be did," said he, shaking his head. "You've got to lick me fust, you know; and I'll be ——" here he added a word more forcible than elegant, "ef it lies in your boots to do it."

"Randolph," said I, coolly, "I have just laid down two rules to the school. One forbids profane words, and the other all vulgar expressions. You have violated both these rules, and it is necessary to punish you for the offence, as well as to set an example to others in the matter."

I advanced to Ran, who saw I was in earnest. The school was quiet with expectation. The little girls all huddled closer, and the eyes of the boys dilated with expectant delight. Ran waited until I came within arm's length, and then aimed at me a ponderous blow. The blow was weighty, the intention earnest; but what are intentions and blows, against science? My old lessons in fisticuff knowledge were brought into play. I parried the blow with my right hand, and "put in a left-hander," as the fancy say, that "floored" my antagonist. Down went Ran with a force that made the puncheon floor rattle. As agile as a cat, he was on his feet in an instant; and in his rage at the unexpected blow of mine, ran forward to grasp me by the throat. Left open to my tender mercies, he received this time a blow from my right hand, and down he went again. He rose a little slower than before, and approached with more caution. At last, he ventured another blow, which I threw off easily with my left arm, and, in return, gave him "a right-hander," which brought him to his back.

Ran rose slowly, shook himself, wiped the blood from his nose with his handkerchief, came towards me, paused, then shook his head, and went towards his seat. Before he sat down, he looked around, and addressed the wondering pupils in these memorable words:

"Boys, we've got a master o' some account. Ef any one kin teach a man, *he* kin. That's certing."

My throne was now secure. The chief rebel had given in his adhesion, and we went to business.

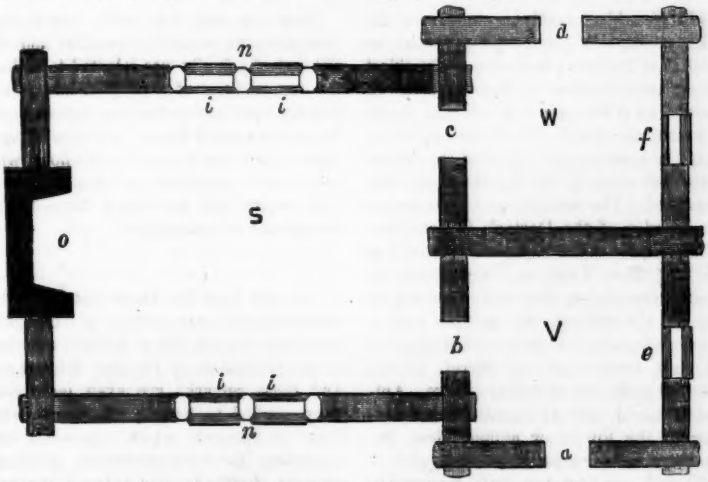
I have taught school for many years—for my success in that enterprise fixed my vocation; I have guided the feet of thousands in the path to knowledge, as well as taught myself a deal; but I never have had a pupil so docile as Randolph Adkins, nor one who made so much progress in so short a time. He pursued knowledge after the fashion that Jehu drove—furiously; and now that he is a famous lawyer, he never comes to attend the Supreme Court, in the city where my large and popular Academy is located, without devoting one evening to recalling old times to our memories, and laughing with me over the day when I set him upright in the temple of knowledge, by first knocking him down.

LOG SCHOOLHOUSES.

IN newly-settled portions of the country, the schoolhouse, like the dwelling of the emigrant, is made of logs of wood. A log-house, whether for temporary or permanent occupation, whether meant to shelter man or the inferior animals, can be so constructed as to be convenient, comfortable, healthy, and picturesque. As generally built, the log cabin is the reverse of all this. At first, appears a square, covered pen, chinked and daubed with mud, with a mud and stick chimney at the gable end,

and a door-hole at the side. As the circumstances of the emigrant improve, or he obtains leisure, he erects him a building of hewn logs, with a stone chimney, and a shingle roof. In this he rarely places a window—hardly ever more than one. There is no ventilation, and a full supply of daylight is only had by opening the door. The schoolhouse is built after a worse fashion than the dwelling, and being badly ventilated at all times, is uncomfortably cold in winter, and unpleasantly hot in summer. For all this there is no need. Both teacher and pupils are entitled to better accommodations, and they could have them with no more trouble than that taken at the present time. We propose to give the ground-plan, and some remarks upon the general structure of a building, which can be erected as readily as any of those in present use.

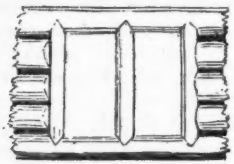
As most of these backwoods schools, especially in thinly-settled districts, are made up of few pupils, the schoolhouse need not be very large, but it should be always of that size that would afford ample room for its inmates. It should be sufficiently lofty to allow the voice full play; and should have enough windows to transmit abundant light, and aid in the passage outwards of carbonized air. Its door should be sheltered from the blast, by a vestibule; and should be so arranged, that, on being opened in winter, a sudden change of temperature will not be effected within. It should have the chimney as much within as possible—if entirely inside the logs, so much the better. The wood-pile should be covered from the weather, and connected with the schoolroom. There should be a substantial stone foundation, banked with earth, and sunk, at least, eighteen inches in the ground, to prevent its displacement by frost. The earth-stopping will prevent the cold, winter winds from coming up through the crevices of the puncheon floor, and cutting the legs of the children. The roof, whether of puncheons, slabs, or shingles, should have a high pitch, and the joints should lap perfectly. In laying the floor, the joists should be supported in the centre by stone pillars, and should be not more than two feet from centre to centre, unless very heavy. About two feet beneath the roof, there should be small notches cut in one log, on each side, at intervals through its length, for purposes of ventilation. The



rest of the building should be solidly chinked, and daubed with well-beaten clay, in which chopped straw has been mixed. These requisites complied with, a substantial and comfortable schoolhouse may be erected in any neighborhood, where wood is plenty.

We give the ground-plan of such a

schoolhouse. It shows a schoolroom, S, eighteen by twenty-four feet, and twelve feet high in the clear. This is approached by the door, *b*, through a vestibule, V, which is eleven by twelve feet, is lighted by a window, *e*, and entered by the door, *a*. In this, there may be hooks, or deer's antlers, to receive the hats and overcoats of the pupils. Next to the vestibule, is the woodhouse, W, of the same size as the vestibule, connecting with the schoolroom by the door, *c*, entered from the outside by the door, *d*, and lighted by the window, *f*. On each side of the school-



room, which has the chimney, *o*, at its end, are two double windows, *i*, *i*, *i*, *i*. These have a log mullion, *n*, in the centre, one foot by one and a half, in thickness. The frames of the doors and windows are heavy puncheons, pinned on to each log by heavy locust or oak pins. The windows should be hung with weights and pulleys, if possible, so that the upper sash can be lowered, to permit the more rapid escape of the heated and vitiated air, during hot weather. If this be not practicable, the ventilating holes, before spoken of, should be quite numerous.

Where slabs can be had, a very capital roof can be made of these, breaking joints by the flat surfaces. The roof should project at least two feet beyond the walls, in every direction, both for adding to the look of the house, and protecting the walls as much as possible.

Such a building will cost but little, will endure longer than the present structures, be commodious, comfortable, and healthy, and commend itself, when once erected, to the favorable judgment of the community.

BURCHARD, ON PHYSICAL EDUCATION.

THIS subject continues to attract the attention of parents and guardians, as well as of teachers; and some of the ablest of our scholars show by their frequent allusions to it how much it interests them. An instance of this lies before us, in the shape of a manuscript report of an address delivered recently by the Reverend Dr. Burchard. The remarks were made upon the occasion of the Doctor's inauguration as Chancellor of the Ingham University, at Le Loy, New York, and were received most favorably, as they well deserved to be. In his address, the speaker took a view of education "in its threefold aspect—Physical, Intellectual, and Moral; corresponding with our threefold nature—Animal, Rational, and Accountable." Beginning at the lower, or animal view, the Reverend Doctor remarked as follows:

Need I say that too little importance has been attached to a Sound Body, as indispensable to execute the high behests of the Mind?

Time was, and that within our limited remembrance, when the weakest and the sickliest of a family was selected to endure the wear and tear of a collegiate education; and the consequence has been a premature decay of parental hopes, or a class of men representing the learned professions, who have been constrained to drag about, in their weary and debilitated frame-work, an epitome of the hospital.

* * * * * *

Yet, who does not know that in all the arguments and essays written, few thoughts have been uttered, fewer facilities afforded for the promotion of Physical Education? And these remarks are even more just when applied to Female education. The figure of Solomon, which represents our daughters as "Corner-Stones, polished after the similitude of a palace," conveys the idea of *Strength*, as well as beauty—a source of endurance and support. But how few, after having completed their

studies at a fashionable boarding-school, may be said to have *Strength*, especially of Muscle. Two causes, as diverse as the opposite and conflicting motives which appeal to the ambition of the young, may operate to produce disease, debility, and premature decay; the mind and the body both becoming sources of temptation, and often leading to a violation of the laws of health. Thus, those whose highest ideal of beauty is a cultivated mind, in their all-engrossing attention to study, in their absorbing anxiety to excel, often fail to take appropriate exercise, or trench upon the hours of sleep; and as the higher nature wrestles and achieves, the lower waxes weaker until the vital energies are gone, just as too much heat and action in an engine, may tear the machinery to pieces, unless the bolts and fastenings are made proportionately strong. There must be harmony in the development of mind and muscle, brain and blood, or nature will exact a recoil, and the most stalwart must suffer. Then there is another class, who incur an inevitable penalty, not from their idolatry of mind, nor their devotion to study, but from their too obsequious observance of the laws of Fashion; always imperious in her demands, often taxing her votaries beyond the measure of their strength, summoning them to the party of pleasure, holding them beneath the spell of music and the fascinations of the dance, until the brain reels from the intoxication of the scene—the "*vis-vitæ*" is exhausted.

Such are the sources of peril to young ladies—the Scylla and Charybdis to be avoided in the process of acquiring an education. Alarm-bells from broken constitutions, and from the graves of the early dead, are sounding throughout the land. We could point to some of the finest specimens of female genius, now burning with diminished lustre, and whose light must soon go out; aye, we might conduct you to the hallowed spot, bedewed with parental tears, where the form of many a lovely maiden rests; and if you would search for the secret of this painful bereavement, you would find it too often in a total disregard of the laws of the physical system.

These facts are patent in all the land. Our daughters, instead of being hale and rubicund, an ornament to our homes, the hope of our years, making melody in all the paths of life, are often-walking skeletons, dirge-like in their spirit and tone, a perpetual prophecy and prelude of early decay.

In these days of abundant reading, we would advise a careful reading of that quaint old volume, "The Anatomy of Melancholy," as a book rich in suggestions as to the nature and causes of many of the evils that haunt and oppress the spirits of the young. Strange as it may seem, physicians often prescribe for sin in the shape of sickness, and for moral dereliction in the form of physical disease, as though the Materia Medica could be substituted for the moral law.

Let the bodily humors, designed to feed physical strength, instead of being drugged by medicines, absorb purity and health from Nature herself, and distil through all the sinews, nerves, and animal functions, the essence of endurance—*the elixir of life.*

Fresh air, pure water, wholesome food, regular sleep, plenty of exercise, and a "conscience void of offence," will keep the system all glowing with health, and save the doctor many a headache in solving the riddle of your debility.

It is an encouraging feature of the times, promising well for the future, that many of our literary institutions are associating Gymnastic exercise with intellectual pursuits, as essential to a complete education.

Elaborate books, developing the principles and rules of physical training, accompanied with life-like figures and attitudes, are now eagerly sought and read; professional men, including the clergy, are beginning to feel anew the spring and elasticity of young life, arising from "the light parlor exercise" developed into a beautiful system; while the more vigorous exercises of "pulling," sparring, wrestling, and unnamable evolutions, are resorted to as a means both of pastime and of strength. It would seem as though the days of Athenian glory were again to dawn; when he who could run the swiftest race, lift the heaviest weight, as well as write the most scholarly essay, bore away the laurel-wreath of fame, and was regarded as the model man of the times.

TEACHING GEOGRAPHY, ILLUSTRATED.

THE mind is naturally inquisitive. We see the evidence of this in the questions asked by children respecting any subject that engages their attention. This natural disposition of the mind to inquire into the reason of things, when properly cultivated and strengthened, stimulates the mind to a greater exertion of its powers, and leads to a thorough investigation and comprehensive understanding of the various subjects presented for its consideration; but when pupils are required by those to whose care they are committed for instruction, to accept words without ideas, and facts without principles, this inquisitiveness of mind loses its natural force, and becomes feeble and inactive; and thus the main avenue to the development of the mental powers, and to true knowledge, is closed.

These remarks, while true in their general application, have a special application to the methods of instructing youth in the various branches of study pursued at school. As an illustration, we may take the methods of teaching Geography. The common method is to assign a lesson in the book, and require the pupils to commit to memory the answers to the several questions contained in it. If the answers are correctly repeated, the pupils receive the approbation of their teacher for having a "good lesson," and the next lesson is assigned, and so on. Pupils thus taught, if asked: "What is the earth?" will answer (with satisfaction to themselves and the teacher too), "The planet on which we live." To show the unprofitableness of such teaching, let me ask: Of what real benefit is it to a pupil to repeat the answer above, if it is unintelligible to him, as it must be, if he has no distinct idea of a planet, and no explanation has been given? He might repeat, with equal profit, the answer given in an old geography: "An oblate spheroid." In like manner, the simple answer that the axis of the earth is "an imaginary line passing through the centre of the earth," profits little; for the pupil will be at a loss to understand why a line should be imagined to pass through the earth's centre in one direction rather than another, or why any line should be imagined at all; or if the answer be: "The line on which the earth turns," the pupil will conceive of a ball revolving on a rod, or a wheel on an axle, and then wonder what kind of a line the earth turns on.

To be able simply to repeat from the book the answers to the questions: What is the earth, its shape, axis, poles? &c., is really of but little value. The pupils should be familiar with the ideas contained in those answers. To aid them in acquiring that familiarity, many explanations and illustrations are required from the teacher. Instead, however, of being confined to the questions and answers of the book, let the teacher take up the subject apart from the book, and, in a few familiar lectures, let him convey to the minds of the pupils the fundamental ideas of the subject; bearing in mind at the outset, and as he proceeds, that the ideas and conceptions of the subject, so familiar and distinct to his own mind, are almost wholly wanting in the minds of his pupils. Thus, since Geography is, as the word itself signifies, a description of the earth, the first question that arises, is: What is the earth? But instead of asking the pupils this question at the outset, let the teacher rather, by a course of plain, simple (not silly) questions, prepare their minds for the full import of such a question. Proceeding from the known to the unknown (inductive reasoning), let the pupils first be questioned respecting the portion of country in which they live, and with which they are more or less familiar. This will lead to inquiries respecting the portions of country or bodies of water lying beyond, and these inquiries (answers to which may be supplied by the teacher) will lead to still others in the same direction, and so on, till the general inquiry is raised in the minds of the pupils: Where and what is the limit to this vast plain (apparently) of lands and seas, in the midst of which we are living? In like manner, the inquiry may be raised respecting the depth of the earth beneath us. Following the track of discovery, the

views of the ancients respecting the extent and foundations of the earth, may here be given, then the views of Columbus, directing special attention to the object of the expedition (based on his views) which led to the discovery of America. And thus the pupils may be led along, step by step, till they are enabled to realize, in some good degree, the important facts respecting the form and extent of the earth, as developed by modern science.

The question will now arise in the minds of the pupils: What is the foundation of the earth—on what does it rest? As this question is suggested by the idea that an unsupported body will fall, the teacher must proceed at once to acquaint his pupils with the principles of inertia and gravitation; and here, as elsewhere, let him bear in mind that in the natural order, ideas precede names; therefore, distinct ideas of these principles should first be conveyed to the minds of the pupils, after which, the names by which they are designated may be given. A knowledge of these fundamental principles of matter, and their application, will qualify the pupils for an intelligent understanding of the facts, which may now be stated, respecting the earth's isolated position. With distinct ideas of the size, form, and isolated position of the earth, the attention of the pupils may now be directed to the relation of the earth to the heavenly bodies. In pointing out this relation, let it first be impressed upon the minds of the pupils, that the heavenly bodies—sun, moon, and stars—are in reality immense bodies of matter, like the earth. The idea of a Planetary System may then be unfolded—a Sun as the centre, giving forth light and heat to other smaller bodies (planets) revolving around it, while around these smaller bodies revolve one or more still smaller bodies (satellites or moons), the planets and satellites reflecting, each to the other, the light emanating from the sun. Next, may follow the statement, that, though the Universe, according to the revelations of Astronomy, is probably composed of many such systems, or a combination of them, we have definite knowledge of but one such system—our own—of which the Sun is the centre, the Earth, and a few, comparatively, of the stars (in appearance), are the planets revolving around it, and the Moon is the satellite revolving around the Earth. In this connection, it might be well for the teacher to state a few facts respecting our planetary system—the comparative size of the bodies composing it, their relative distances from each other, &c.—also to explain the cause of the similarity in appearance, to us, of the planets and fixed stars (suns). The motion of the planets and satellites in their orbits, will be readily understood by the pupils if briefly explained by the teacher, the principles (inertia and gravitation), which, combined, produce planetary motion, having been already explained. A knowledge of the principle of gravitation, will also enable the pupils to account for the spherical form of the earth and heavenly bodies.

Having obtained a definite knowledge of the earth as an immense sphere, revolving, in common with other similar bodies, around the sun, the pupils are now prepared for the next step in order—the revolution of the earth on its axis. After stating the fact that the earth revolves (turns over) at the same time that it moves around the sun, let the teacher proceed to convey to the minds of his pupils, by means of suitable illustrations, an exact idea of what is meant by the axis and poles of the earth—their only idea of an axis, hitherto, being that of a rod, of some kind, on which a wheel or ball revolves. As an auxiliary idea, let the teacher show that lines and points (definite, fixed directions, and positions,) may exist without any outward, visible marks or signs to indicate them. And thus let him show the pupils, that in the revolution of a body (spherical or other form), though it be solid, and hence no rod passing though it on which it revolves, there will still be a certain fixed line or direction through it, around which the body (the particles forming it) revolves, and two fixed points (positions) on the surface of the body where the line terminates—the line and points being determined by the direction in which the body revolves.

The pupils now understand that the poles of the earth are two fixed points on its surface, their position being determined

by the direction in which the earth revolves. From the poles as starting points, the equator and parallels are determined. A few words respecting meridians, and an explanation of the use of parallels and meridians, in determining the relative positions of portions of the earth's surface, or points on its surface, and the pupils are now prepared for an intelligent and successful pursuit of the study upon which they have entered.

In determining the position of the tropics and polar circles, and in showing how the change of seasons is produced, which may here be done, an explanation of what is meant by the plane of the earth's orbit, and of the inclination of the earth's axis to the plane of its orbit as it revolves around the sun, will be necessary. This will be rendered comparatively easy, however, as the facts and principles upon which this part of the subject is based, have been already dwelt on. At the proper point, the exact form of the earth (spheroidal) may be stated, and the probable reason of it given, also the elliptical form of the earth's orbit.

The course marked out thus far, if carefully pursued, will occupy the time, not of one or two recitations, but of many; since it contemplates, not the strengthening of the memory simply, but rather the expansion and growth of the mind in all its faculties—a work requiring time, since growth of mind, like growth of body, requires time. New ideas are to be unfolded, and their relations carefully pointed out, requiring much time for the explanations and illustrations thereby rendered necessary. The pursuit of such a course, however, will not only result in growth and discipline of mind—one of the most important ends to be attained in a course of instruction—but the true foundation will be laid for the successful pursuit of the particular branch taught.

SPECTROGRAPHY.

ALTHOUGH Sir Isaac Newton believed that, of all his discoveries, none equaled in importance that of the compound nature of light, yet he little thought that thereby he was giving to posterity an assistant which, when properly employed, would not merely open up hidden things on our own globe, but even reveal the nature of extra-mundane bodies. It was reserved for this century to ascertain its true significance. For nearly a hundred years, the discovery was regarded as but little more than a curious fact; but in 1802, Wallaston observed that, under certain circumstances, dark lines could be discerned traversing the solar spectrum. His observations, however, attracted but little notice at the time; and even twenty-five years afterwards, when Mr. Fox Talbot published, in Brewster's Edinburgh Journal, a like statement, no one was found to follow up the investigation, and the matter seems to have been forgotten. A number of years after this statement by Talbot, Fraünhofer, the German optician, entirely ignorant of the observations by Wollaston and Talbot, reannounced the same fact, with the additional remark, that certain of the lines in the solar spectrum appeared only at particular seasons or under peculiar conditions of the atmosphere, and also, that none of them coincided with the limiting lines of the colors.

These statements of Fraünhofer awakened intense interest among scientific men. Sir David Brewster accounted for the lines by referring them to the influence of our atmosphere upon the sun's light; since by passing a ray through a colored vapor, dark bands appeared. The irregularity of occurrence, he supposed to be caused by the presence or absence of some particular vapor in the atmosphere. He also perceived that the color of the vapor had no effect upon the lines, since the red vapor of hyponitric acid gave a line in the blue. These facts attracted the attention of Profs. Wheatstone and Miller, who, observing that salts of many metals when dissolved in alcohol and ignited impart peculiar tints

to the flame, determined to investigate the prismatic spectra produced by these colored flames. In several experiments, alcohol containing some metallic salt in solution was burned in a common spirit-lamp; a ray of the light proceeding from the flame was then directed through a vertical slit in a screen, and passed through a prism into a telescope of small power, by which means the spectrum could be more accurately examined than if merely cast upon the screen. The result was that, as previously supposed, substances which produced the same colored flame could be easily distinguished by their spectra.

The success of these experiments naturally led to further investigations, and Messrs. Bunsen and Kirchhoff, as the result, have, by the use of improved apparatus and the examination of a vast number of salts, laid the foundation of a new science now known as Spectrography; a science so vast and so complex, that, to use Kirchhoff's own words, "It is indeed a study for one's lifetime." These gentlemen triumphantly vindicated the theory advanced by Wheatstone and his associates, that each element has an individual spectrum, and also ascertained that the arrangement of lines in each is so distinctly marked, that where the substance is present in quantity so minute as to defy detection by the ordinary means of analysis, it is distinctly perceptible by aid of the spectroscope. Such being the case, the matter could not long remain a subject of merely curious scientific inquiry. New experiments were initiated, resulting in the discovery of new elements and of new properties of those already known. Very many bodies previously regarded as extremely rare, were found generally diffused in limited quantities throughout nature. Lithia, supposed to be one of the rarest of inorganic substances, was found existing in sea and spring waters, in the ashes of marine plants and tobacco, as well as in human blood and milk: while in the mother-liquor of tartaric acid, as usually manufactured, it was so abundant as to be profitably extracted. Even in a Flanders-brick lithia and strontia were detected. M. Morin, of Versailles, during the past spring, by means of the spectrum, ascertained that carbon could be vaporized.

But, as we stated, the spectrum has not merely assisted in investigation of known substances, but has led to the discovery of new elements. While examining the mineral waters of Kreuznach in search of lithia, Bunsen and Kirchhoff noticed two bluish lines which they could not identify, and therefore conjectured the existence of a new metal. After evaporating twenty tons of the water, they obtained two hundred and forty-two grains of the platinum salt of a new metal, which, from its blue lines in the spectrum, they termed cæsium. Associated with it, they also discovered another metal, which, giving a dark red line, they called rubidium. Sir Wm. Crooke, while submitting a piece of native sulphur to this test, discovered another metal, which giving a green line, he named thallium. In like manner, MM. Reich and Ritter discovered the metal indium in a specimen of arsenical iron pyrites. These metals have all been isolated, and their compounds in great measure examined. It is our intention to publish descriptive articles concerning them when the facts are more distinctly stated.

That spectrography will become a most valuable assistant in qualitative analysis, is evidenced by the fact that $\frac{1}{3300000}$ gr. of sodium or $\frac{1}{30000000}$ gr. of thallium is sufficient to produce a decided reaction on the spectrum. If an alloy be ignited, the prism, as it were, separates the metals and presents distinctly the spectral characteristics of each. There can scarcely be a doubt that, before many years, the spectral analysis will be used, as suggested by Talbot in 1826, for the detection of mineral poisons.

Between the spectra arising from ignited vapors and that of the sun, there is one marked difference. All the lines of the former are bright, while those of the latter are dark. The experiments previously stated, did nothing towards explaining this peculiarity. Among the numerous black lines crossing the solar spectrum, Fraünhofer perceived seven, especially distinct, which he designated as B, C, D, E, F, G, and H. Between these occurred a vast number of fine lines and nebulous bands, together causing a hazy appearance. In order, if possible, to elucidate the mysterious difference referred to, Kirchhoff di-

rected his attention to this haze. The course which he pursued was, doubtless, based upon an observation made in 1849, by Foucalt, a French chemist, who ascertained that, in many instances, the dark lines of the solar spectrum coincided with the bright lines of certain metallic spectra. On passing a bright solar spectrum through a flame, colored by sodium vapor, the yellow sodium line no longer appears, but in its place a strikingly defined dark line. Upon extending these observations, Kirchhoff found that the sixty bright lines of the iron spectrum might be reversed in the same manner, and also had their analogs in the solar spectrum. From these and numerous other experiments of similar character, he drew the truly philosophical conclusion, that the central mass of the sun, being more intensely ignited than its atmosphere, overcomes its reaction, and thereby causes a reversal of the lines in the spectrum of the latter. This once established, the way was opened for more extended observations. To discover the constituents of the sun's atmosphere, was the next object. Iron, copper, nickel, cobalt, zinc, manganese, with many other metals, have been detected in the solar atmosphere. The evidence in favor of potassium and sodium is not positive, many of the reactions of these metals being, in all probability, referable to conditions of our own atmosphere. The conclusions derived from all these experiments on the solar spectrum, is that the sun is an incandescent mass, surrounded by an atmosphere containing the vapors of the metals mentioned. So that now we are enabled intelligently to answer the question, "What is the sun made of?" But spectrography does not stop here. It has examined a number of fixed stars, and although the investigations are not yet closed, yet enough is known to warrant the belief that they too are of like composition. By its means, Grandean was enabled to analyze the lightning flash. It is now being applied to practical use. Of this a beautiful instance was given in our summary for August.

Yet the science is still in its infancy. What it has done is but the beginning; what it may yet do is beyond our comprehension. By its aid, doubtless, many new elements may yet be added to our list, and many peculiarities of those already discovered may be revealed. It has, in great measure, shown the unity in chemical constitution of the universe, and thereby added another pillar in support of that grandest of human conceptions, the nebular hypothesis, which has so long rested under the ban of zealous theologians. In the July number of Silliman's Journal, Prof. Henrichs, of the Iowa State University, mentions a possible result of these investigations, which, should it be realized, would prove one of the greatest achievements of modern science. After showing that the lines are arranged at regular distances, and that their relations to each other are governed by fixed laws, he concludes that the lines must be produced by the bulk of the atoms, and that an exact knowledge of their distribution must lead to a knowledge of the relative dimensions of the atoms themselves, their length, breadth, and thickness; remarking, "Thus optics will give us the form and size, as chemistry has given us the weight of atoms."

DAY-DREAMS OF A SCHOOLMASTER.

One of the pleasantest of all pleasant books is the new volume, "Day-dreams of a Schoolmaster: by D'Arcy W. Thompson." The author is a thoroughly-bred man, in two senses—thoroughly-bred as a scholar, and again as a gentleman. There is an originality in his style, too, which is undeniable; and when he assails abuses, or complains of a grievance, he does it in a way that tickles as well as stings.

Mr. Thompson has some peculiar ideas, some of which are new and good; some of which are good and not new; and the rest neither new nor good. He believes that the colloquial system is the best to teach the ancient as well as the modern languages,

and there we are disposed to concur with him. But when he undertakes to impart a knowledge of the ancient and modern tongues *at the same time*, he does too much, unless his boy be a very old boy, with a hard brain, stout sinews, and a vigorous will.

In regard to girls he takes some views suitable enough to our ideas, but probably heterodox on the other side of the water. He says:

"I assert that a good Latin grammar might be limited to twenty-four pages, and sold, with a large profit, for sixpence; and that this bookling, with an extra outlay of half-a-crown, might, with a competent master, carry scholars over two years of work. And I also assert that girls might, with great advantage, pass through two or even three years of Latin teaching, if that language were taught on an easy, simple, and natural method.

"Although a schoolmaster of boys, Reader, I have still a touch of gallantry. Smile at my proposal. I would undertake to teach Latin to a class of girls twelve years of age, without the use of pedantic and expensive books, or of pedantic and meaningless grammar rules. My pronunciation would be Italian, as nearly Tuscan as I could make it. I would never forget that I was training children, not to be schoolmistresses, but gentle ladies in a drawing-room, and gentler mothers in the nursery. And in two years, perhaps—and in three years, most certainly—I would have girls on my class, who would speak an old language, not unlike the language of modern Tuscany, in a way that would shame their brothers and cousins, who had been five years at any grammar-school in the kingdom, and trained on the old system of Elementary Unintelligibility."

One matter troubles Mr. Thompson exceedingly—namely, the social status of teachers in Great Britain. Here, and on the continent of Europe, this is scarcely a grievance. A man fitted for society will go into society, be he what he will—a man of parts will obtain acknowledgment. But with great intellect, solid learning, and fine manners, it may be difficult or impossible for a schoolmaster in England to enter society, or to be even treated with courtesy. Mr. Thompson evidently thinks so, and thus proposes a rather ludicrous remedy:

"Could not some violent but easy remedy be suggested for the cure of our social abasement? Certainly. Why should Barring-out be confined to boys? or Strikes to artisans? A fig for political economy! Let us form ourselves into league, and proclaim a general STRIKE OF SCHOOLMASTERS! There will be some sneaking recusants among us; but we will brain them with their own dictionaries.

"Some summer morning Scotland will awake, and find every grammatical fountain frozen. What fun it will be for the boys! For a week the parents may outface the inconvenience; but in a month, the animal, always latent in boyhood, will be growing rampant and outrageous. Gradually will it develop, unsoothed by the influences of grammar, unchecked by the sterner influences of our magic leather. No father will be safe in his own house. The smaller boys will be smoking brown paper in the drawing-room, and the older boys wallowing in Bass and Cavendish in the lower kitchen.

"Meanwhile, calmly reposing in the stillness of his back parlor, M'Gillicuddy will be putting the finishing stroke to that folio edition of Cornelius Nepos, on which his fame in after ages is to rest; and I, in my aerial lodgings, shall be setting to Greek iambics the moral aphorisms of the great Tupper, whose terseness and originality are the wonder of a grateful people.

"Our hospitable Provost, like his predecessor in olden days when the English were marching north, will hold a meeting of troubled citizens. They will meet in arms: each father will be provided with his life-preserver of cut leather. One speaker will tell how nouns are at a fabulous premium; that an adjective may not be had for love or money. Another will tell the horrible tale, how whole families have for weeks subsisted on the smallest prepositions.—They will attempt a compromise. We shall decline treating on such terms. They will surrender unconditionally; and our terms—monstrous as they may seem—shall be as follows:

"A Schoolmaster, who shall have gradu-

ated at a University, shall hereafter be addressed, personally or epistolarily, with the courtesy usually shown to a second-rate Solicitor or a briefless Advocate.

"Whosoever shall wittingly and wilfully offend against the above decree, let him for the first offence be dismissed, after due admonition; but, on a second offence being proven, let him be sentenced to parse verbatim the folio edition of M'Gillicuddy's Nepos, declining all nouns, conjugating all verbs, and repeating all syntax rules, *usque ad Rei ipsius et totius Curiæ nauseam.*"

Our Schoolmaster can touch a different vein. His description of the dull boy will show his powers in a more pathetic vein.

"Meanwhile, at the end of the last bench upon my class sat a boy who was very backward in his learning. He was continually absent upon what seemed to be frivolous pretenses. These absences entailed upon me much additional trouble. I had occasionally to keep him and a little remnant in the room when the others had gone out to play; to make up to him and them for lost time. And on one occasion my look was very cross, and my speech very short; for it seemed to me provoking that children should be so backward in their Latin. And when the work was over, and we two were left alone, he followed me to my desk; and said: 'You have no idea, sir, how weak I am.' And I said: 'Why, my boy, you look stout enough.' But he answered: 'I am really very weak, sir; far weaker than I look!' and there was a pleading earnestness in his words that touched me to the heart; and afterwards, there was an unseen chord of sympathy that bound the master to the pupil, who was still very dull at Latin.

"And still he would be absent; at times, for a day or two together. But it excited no surprise. For the boy seemed to sit almost a stranger among his fellows; and in play-hours seemed to take no interest in boyish games. And by and by he had been absent for some weeks together. But I was afraid to ask concerning him; thinking he might have been removed, as many boys have been, without a letter of explanation, or his shaking me by the hand. And one morning I received a letter with a broad black edge, telling me that he had died the day previously of a virulent, contagious fever.

"So when school was over, I made my way to his whilome lodging; and stood at the door, pondering. For the fever, of which the child had died, had been to me a Death-in-life, and had passed like the Angel of old over my dwelling, but, unlike that Angel, had spared my first-born and only-born. And because the latter sat each evening on my knee, I was afraid of the fever, and intended only to leave my card, as a mark of respectful sympathy. But the good woman of the house said: 'Nay, nay, sir, but ye'll see the Laddie;' and I felt drawn by an influence of fatherhood more constraining than a father's fears, and followed the good woman into the small and dim chamber where my pupil was lying. And, as I passed the threshold, my masterhood slipt off me like a loose robe; and I stood, very humble and pupil-like, in that awful Presence, that teacheth a wisdom to babes and sucklings, to which our treasured lore is but a jingling of vain words. And, when left alone, I drew near the cheerless and dismantled bed, on which my pupil lay asleep in his early coffin. And he looked very calm and happy, as though there had been to him no pain in passing from a world where he had had few companions and very little pleasure. And I knew that his boyhood had been as dreary as it had been short; and I thought that the good woman of his lodging had perhaps been his only sympathizing friend at hand. And I communed with myself whether aught I had done could have made his dullness more dull. And I felt thankful for the chord of sympathy that had united us, unseen, for a little while. But, in a strange and painful way, I stood rebuked before the calm and solemn and unrebuking face of the child on whom I had frowned for his being backward in his Latin."

These extracts only serve to give the reader a faint idea of Mr. Thompson's genial style. It is to be hoped that some of our publishers will reprint the book from the Scottish edition.

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The Fourth Ward Scandal.

IT may be wrong to feel, and foolish to admit, but we have an admiration for dexterous thieves. We have long looked upon larceny as one of the fine arts. There is as much science to be shown in planning a raid upon a shopkeeper's till, as in laying out a railroad; and as much manual dexterity in picking the watch from a fat man's fob, as in amputating a leg, or extirpating a tumor. Among the Camanches, an expert horse-thief is a highly honored member of society; and it may be that the Camanches are right. At all events, a successful thief, who lives up to the traditions of his art, and recklessly scatters upon the multitude what he takes from the individual, receives the homage of our high consideration—including a careful consideration as to the best mode of protecting our purse from his skill. We never see him at the bar, with twelve noodles in the box ready to pronounce upon his guilt or innocence, and one rogue on the bench anxious to send him to prison, without thinking of the unhappy hare, pursued by one hunter and a dozen hounds. We open our heart on account of his peril, and at the same time button our pockets, lest some of his cronies, or the lawyers around, or some others of like habits, should relieve us of our loose change.

Yet when we avow a sympathy which the thoughtless will censure, it must be understood to apply only to those who pursue their ancient calling after those highly honorable principles laid down by the earliest minions of Mercury. There are kinds of rascals who are utterly barred out of our sympathy. The thieving contractor—that base wretch who furnishes the soldier with cloth that the fingers can tear, and beef that the teeth can not; who provides boots that will not go on, and gunpowder that will not go off—the official who has the inspection of government supplies, and yet winks at the contractor's rascality—the trustee who plunders the widow and orphans placed in his charge—these we utterly abhor. That all their rascalities could be combined, we never believed. From that species of infidelity we have been recently converted.

Some time since, the School Trustees of the Fourth Ward, in the City of New York, entered into a regular conspiracy—not to overthrow the government—there is some manhood implied in the crime of treason; not to make Astor or Stewart "stand and deliver"—there is some boldness requisite for robbery; but to tax heavily the unfortunate schoolmasters and schoolmistresses under their control; to make them pay far more than a tithe of their miserable pittance; and to fill their own purses, by emptying those of the hardest worked and poorest paid of all brain-workers. So relentlessly did they carry out their purpose, that even a poor, lame girl, was made to pay a heavy sum in order to retain a situation, which, to her, was daily bread, and hence her means of life. A stir was made—less than a nine days' wonder—and after a little expenditure of virtuous indignation on the part of the journalists, the matter rested. We have waited thus far in vain for the trial and conviction of the offenders—of men (we beg pardon of the human race for using the word), who, being sworn to act justly in their offices, added perjury to the rest of their crimes. But justice is careless, or deaf, or sleeping off the effects of her last night's orgies; and the culprits still taint the air of the streets of the metropolis.

If crimes like these are to pass unpunished, we have no hope to ever see morality and virtue in fashion. All goodness in the public would be past praying for. The next best thing we can do is to teach thieving in a regular and scientific way; to elevate the art into a higher sphere; to have

our Normal Institutes for the masters of Thieves' Schools; and to establish a Fagin Professorship of Appropriation in each of our colleges. Then the thieves who have some little conscience left, may keep such people as the Fourth Ward plunderers down, by the contrast of a purer example. The only difficulty, should such offenders exist after that, will be to find a name for the culprits themselves. The English language is barren of nouns and adjectives to express and qualify their crime, while there is no term harsh enough to give the criminals. The old word "scoundrel," would be degraded by a companionship so vile. To apply it once to the Fourth Ward School Trustees, would so debase it, that it would need to be washed, scrubbed, and carefully fumigated, before it could be admitted again into any well-regulated dictionary. By all means, if these fellows are to escape scot-free, let us vindicate our character for morality and decency, by taking ordinary thieves into favor; and giving petty larceny an efficient and thorough protection by the municipal government.

Condensation.

IN our present number, we give some paragraphs from new books, embodying hints, some of which have much value, and some but little. There is one extract about paraphrasing—an exercise once very much in vogue. We do not admire it, since it leads to verbosity, and we say so, in a foot-note to the extract itself. What we there hint, we desire to propose here more formally. We suggest that teachers when exercising their pupils in composition, should encourage a terse, condensed style. Instead of giving their pupils a proverb or pointed sentence, to expand into a paragraph, let them reverse the process. Let them distribute to each boy or girl, some one of the many wordy paragraphs they will find in nine out of ten current books, and cause the pupil to write out the idea in as few words as possible. Such exercises generally given out, would bear their fruits in the shape of a simpler, terser, and more vigorous style of writing in the next twenty years.

Normal Schools.

MEN of sense look more to their enemies than their friends, in order to gather hints for action, or to find cause for caution. A friend, if thoroughly devoted, is apt to have his judgment warped by his friendship, and think that a thing must be rightly done, to have been done at all by the object of his regard. And as of men, so of systems. And as of systems in general, so of the system of normal instruction in particular. Of the general advantage of that system, there should be no doubt. But errors in detail are often ruinous. And in this view of the case, we take up an extract from a speech made against the State Normal School at Trenton, in the New Jersey Legislature, by Thomas Dunn English, who opposed the customary appropriation, and who was supported by so many, that it was only by many concessions that the bill passed by a constitutional majority in the House of Assembly.

Dr. English said:

"I do not doubt the general advantage of a system of normal instruction; but your system, if not perfect, must approximate perfection. To make it do so, its object must be kept in mind. The design is, to qualify persons to teach. Now there are some who imbibe knowledge as readily as the sponge; but unlike the sponge, they will not part with it under the most intense pressure. They can acquire, but not impart. I remember when I first engaged in the study of medicine, at the University of Pennsylvania, that we had for a Professor of Chemistry, Robert Hare. Of his eminence there could be no doubt. The inventor of the oxy-hydrogen blowpipe; the discoverer of many acknowledged facts of great moment; the friend and correspondent of Berzelius, and the great chemists of Europe; his scientific reputation stood on an enduring basis. Yet his attempts at teaching were painful

and ludicrous. He afforded no aid to the body of students. Except when he performed some of his splendid experiments, for which he had a complete apparatus, the under-graduates abandoned the benches of his lecture-room; or if they came there, engaged in conversation as carelessly as though they were in the street. He finally resigned, and was replaced by another, far less celebrated, and though an accomplished scholar, inferior in profundity and chemical knowledge to his predecessor. Yet the new occupant of the chair of chemistry could teach—he could make chemists—he answered the purpose of his incumbency. You will find similar cases in our common schools; you will find it in the arts, in manufactures, even in legislative bodies. In educating teachers by the State, you want to take those who display this natural ability to teach. You can afford to expend any amount of money in perfecting that quality—in giving it force and precision, and in imparting knowledge to its owners. As it now stands, you send out from your Normal School pupil after pupil, who give no satisfaction as teachers, and thus cast an odium on the system which will yet destroy it.

"Can this evil be amended? I maintain that it can. It is not my business, but those of the friends of the school, to perfect their system. I may say this, however, that where a boy is meant to be educated as a teacher, let him be placed in charge of a class in his school. If he display tact there, cultivate it. If he stand the test of this primal practice, send him to your Normal School for a session. After that, let him take charge of a primary department in a public school. If he show in this position that he can teach successfully, let him return to complete his studies; and whatever money may be expended then by the State in his education, will be returned with more than usurious interest, to the general public. If he do not stand these tests, he has mistaken his intended vocation. He may make a good mechanic, a clever farmer, a skillful physician, an able lawyer, or an efficient clergyman, but he will not make a good teacher; more especially, when he receives that beggarly compensation which this State—and other States too—dole out with grudging hand to the schoolmasters.

"Till you reform your Normal School on this point—till you keep it to its real object, and abandon this scattering of funds on unworthy recipients—you will have opposition at every session to encounter; and though you may succeed now, and it may be next year, you must come to our views of the matter, or have the fabric of your system tumbled about your ears."

It is not our purpose to inquire here, as to whether the charges against the Normal School of New Jersey were correct or not; it is enough to know that those charges come from a respectable source, to examine into the objections made. It is necessary to do all that may prevent the Normal system being brought into disrepute with the masses, and thus having its usefulness impaired, and its continuance endangered. No one seems to question the propriety of Normal instruction, if the proper subjects be chosen. We take it that no friend of the system desires that improper subjects be taken in charge. Will any one point out a mode by which those with an aptitude for imparting instruction shall receive at the State expense the requisite knowledge, and thus give the system the cordial support of all but the ignorant? Will any of our readers give their views on this important subject?

To Contributors.

WE wish to give our voluntary contributors (for whose readiness to furnish us with their views we feel greatly obliged), two pieces of information. Firstly, we desire to obtain practical articles. In favor of such, as our space is limited, others will be excluded without mercy, whatever may be their positive merits. Secondly, an author should write on one page only of his paper, leaving the other side blank. Otherwise he will meet with the maledictions of compositors, and frequently lose all his labor. Also the practice of underscoring certain words to be italicized, is a bad one.

SCIENCE AND THE ARTS.

——According to Sainspierre, ozone is developed by the mechanical action of blowing machines and ventilators producing strong currents. The *Archives des Sciences* contains an interesting account of the views of Clausius on oxygen and ozone. He considers that ordinary oxygen consists of atoms united two and two, while the atoms of active oxygen are single and disunited. The two atoms constituting a molecule of ordinary oxygen he regards as in opposite elective conditions. Ozone, according to M. Soret, is composed of elementary atoms not combined in pairs, which may combine with atoms of undecomposed oxygen as soon as they become free. Schönbein regards ozone as allotropic, and terms the different forms ozone and antozone. His method of obtaining ozone by purely chemical means is to dissolve pure manganate of potash in pure sulphuric acid; into the green solution thus formed, introduce some peroxyd of barium, when oxygen and ozone will be set free. The latter may be detected by the nose. With such ozone Schönbein oxydized silver at —4° F., and by inhaling the gas secured a capital catarrh.

——Professor Spörer of Anclam has recently communicated to the *Astronomische Nachrichten* an account of his observations on sun-spots, from September to the end of last year, in the course of which he remarks that the third quadrant contained fewer spots than the others. The map of 1863 shows the spots to be very unequally distributed, some large spaces being entirely clear, whilst in other parts they are crowded together in a remarkable manner. The elements of rotation were deduced from one spot, which appeared at two periods, and which nearly fulfilled the very important conditions of unvarying heliocentric latitude and longitude. The Professor observes that persistence of form does not prove that the position has not changed, and he thinks that the conditions mentioned above are of much importance. He hopes that Mr. Carrington's book, which he has not yet seen, will contain some information on this point; he certainly will not be disappointed. The spots Nos. 158 and 173 of 1861, were the only two which he had hitherto found to fulfill these conditions; but he now adds another, No. 147, 1863, the apparent size of which underwent no alteration from Dec. 11 to Dec. 18, 1863. He states that the motion of those spots, which have been formed by the fusion of groups, differs widely from the ordinary rate, which, however, the spots gradually take up as they become more and more isolated. He further remarks, that before the final disappearance, the peculiar change always noticed in the direction and velocity of the spot often takes place. The paper concludes with a table giving the motion of the spots for the past year, which shows that the westerly storms of the equator assume an easterly direction in higher latitudes.

——M. Lancelot of Paris has made some extremely interesting experiments concerning the action of butter on copper. Butter immersed in an excessively dilute solution of copper (in which the metal was absolutely imperceptible), soon became coated with hydrated deutoxyd of copper. From the experiments, he concludes, "It has long been known that the acids contained in greasy substances will act promptly on copper; but the above experiment has demonstrated to me that butter is perhaps the most sensitive reagent to detect the presence of that metal, or of its salts, in a liquid; and that, if iron has the property of reducing the salts of copper contained in a very diluted solution, butter itself possesses the property of forming a copper-salt—perhaps a butyrate—which reveals the presence of that metal even when the active reagents most in use have failed to give traces of its existence." This discovery cannot fail to be especially important in toxicology.

——The orbit of the planet Freia has recently been investigated by Herr Oppol-

zer, with a view of settling the question as to its identity with Sappho. The wide difference between the elements as given by Pogson and those of D'Arrest rendered a new calculation necessary, for which, however, only very scanty materials were available. In this manner an ephemeris was calculated which was found only to require a correction of $-9s$ in AR and $+0.6'$ in declination to make it agree with the observed place, thus removing all doubt as to the identity of the two planets. He suggests that Freia is very suitable for the estimation of Jupiter's mass, and that careful observations of the former are therefore of importance.

——Professor von Wittich, in a paper, a notice of which appears in the *Schriften der k. physikalisch-œkonomischen Gesellschaft zu Kœnigsberg* for the last year, gives the following as the reason why we are unconscious that a portion of the image of external objects often rests upon the spot where the optic nerve enters the eye, which spot is insensible to light. The continuity of the image of our field of vision is restored irradiation-wise in the vicinity of the entrance of the optic nerve by the sensations obtained through the parts surrounding the stem of the nerve; between the circles of sensation surrounding that spot there exists an anatomical, but not physiological break. All his experiments go to show that the field of our vision loses as much in extent as is covered by the entrance of the optic nerve, and that, accordingly, our judgment on certain simple and composed figures would be essentially different if they fell on that spot.

The *Mechanics' Magazine* publishes the results of some experiments by Messrs. Demurquay and Leconte, recently communicated to the Academy of Sciences of Paris, on the action of oxygen on animals. It is stated that dogs can inhale from 30 to 40 litres of that gas and more, without evincing any other effect but that of great liveliness and increase of appetite. In order to observe the effects, large incisions were made on the dogs in the axillary region, and when these were in course of healing, the dogs were made to inhale the oxygen. The wounds became strongly infected, and exuded a transparent serum, and in course of time a quantity of *petechiæ* appeared. Oxygen injected into the jugular vein produced the same result. The blood was not sensibly modified in color. Rabbits were found to live seventeen hours in oxygen, and after their death all their muscles were in a turgid state; but the blood had undergone no change of color, and no organ displayed any signs of inflammation.

——Mr. Spence, commenting on the lamentable boiler explosion at the Aberaman Ironworks, which arose from the corroded condition of the plates, gives the following method, successfully adopted with his own steam-boilers, to prevent corrosion, or rather to stop the action from water impregnated by its being in the vicinity of coal-pits:—For every boiler 2 lb. of soda ash (an article easily procured at 1½d. per lb.) is every day given to the stoker; this he dissolves in a bucketfull of cold water, and puts the solution into the water supply for the boilers. An additional advantage is that no crust is formed, all the lime salts that form these crusts being also destroyed by the alkaline solution.

——M. H. Schiff, a French chemist, in a monograph on some derivatives of ethylidene, states that he has succeeded in obtaining the chloride of *demercurodiethylidenediphenammonium*. A rather formidable name, enough to daunt the heart of the stoutest explorer of the realm of science.

——Mr. Hind announces in M. LeVerrier's *Bulletin* that Mr. Pogson has discovered a new minor planet at Madras. He has named it Sappho. The minor planets have now reached the respectable number of four-score.

——M. Decaisne says in *Comptes Rendus* that in three years he has met twenty-one cases of intermittent pulse, occurring among eighty-eight incorrigible smokers, independent of any organic disease of the heart. This affection produced by abuse of tobacco he terms "Narcotism of the heart."

MISCELLANY.

——A biography of Archbishop Whately has been recently published, which contains a number of amusing anecdotes of the great logician. Whately, like Sir Isaac Newton, Raleigh, Campbell, General Jackson, and most of the great brain-workers, was a smoker of tobacco, and his pipe, when its little volcano was extinct, served him for a book-marker. In summer-time he might be seen, of an evening, sitting on the chains of Stephen's Green, thinking of "that," as the song says, and of much more, while he was "smoking tobacco." In winter, he walked and smoked, vigorously in both cases, on the Donnybrook road; or he would be out with his dogs, climbing up the trees to hide amid the branches a key or a knife, which, after walking some distance, he would tell the dogs he had lost, and bid them look for it, and bring it to him. At table, whether as host or guest, he was a supreme talker: wit, humor, learning, pun, fun, sense and nonsense, he poured forth with few of the "brilliant intervals of silence" which other talkers impatiently longed for. It was perilous work to grapple with him; but we think that, in contending with an adversary, he often did what is done in warfare, prepare the pitfalls, into which he saw his foeman tumble, with infinite laughter on the part of the auditors. When merely "smart" people, like Lady Holland, snapped at him, as Mr. Fitzpatrick remarks, "their teeth only met sparkling granite." There was something of a Johnsonian rudeness about him, with exaggeration, for in a drawing-room Whately would, in his forgetfulness, lean back in his chair, in front of the fire, and plant his feet nearly as high as the chimney-piece. At the council-table, his heels would sometimes be where his colleagues' heads were —on the table itself. Chairs perished at his coming, for he used them ruthlessly in argument, and the carpet suffered from one of his tricks of whirling the chair round on one leg, while he was speaking.

Dr. Whately took a great interest in the cause of education, even to the minutest details, such as setting copies for the boys at the schools, to some of which he appended amusing notes. One of these sentences will serve to give an idea of the character of the rest. "A man will never change his mind, if he has no mind to change."

"Soon after the introduction of the convict system to Ireland, a gentleman known and respected as an ardent advocate of reformatories, boasted to a friend who occupied a responsible office in the Irish government, that he held the system in such high estimation that he employed no servants in his house but those who had passed some time in a reformatory. The party so addressed was much struck by the information and its significance, and, with suitable impressiveness, he communicated both to the Archbishop. His Grace listened attentively to the recital, and, at length, quietly observed: 'Your friend will waken some fine morning, and find himself the only *spoon* left in the house.'"

"The ticket-of-leave system found little favor in the Archbishop's sight; and he lost no opportunity to make a cut at it, and if he could contrive to make the sarcasm cut two ways, the joke was all the pleasanter. The Rev. Mr. M'Naught and others, having forsaken the Anglican church, joined the Sectaries, and finally came back to the Anglican church again, Dr. Whately quietly remarked, 'I hope they are not going to send us ticket-of-leave clergymen.'"

"A favorite play with Dr. Whately (writes a correspondent), was pencilling a little tale on paper, and then making his right hand neighbor read and repeat it, in a whisper, to the next man; and so on until everybody round the table had done the same. But the last man was always required to write what he had heard; and the matter was then compared with the original retained by his Grace. In many instances the matter was hardly recognizable, and Dr. Whately would draw an obvious moral; but the cream of the fun lay in his efforts to discover where the alterations took place. His analytical powers of detection proved, as usual, accurate, and the interpolators were playfully pilloried."

"'Cultivate not only the corn-fields of

the mind, but the pleasure-grounds also,' was a motto of Dr. Whately's. This cultivation was often a labor rather than a luxury. His hilarity was not always the result of happiness. 'Gay spirits,' he once said, 'are always spoken of as a sign of happiness, though every one knows to the contrary. A cockchafer is never so lively as when a pin is stuck through his tail; and a hot floor makes Bruin dance.'"

But the Archbishop sometimes caught a tartar, as the following shows:

"The head-master of one of the Model Schools complained that some of the officers intrusted with the inspection of the schools were unduly officious, and not qualified for the duty. 'Surely,' said the Archbishop, 'but one can judge plum-pudding without being a cook.' 'True, your Grace,' retorted the head-master, 'one is not, on that account, qualified to go into the kitchen and take the cook's place.'"

——An interesting discovery has just been made at Angerville, France, in a property belonging to M. Berryer. A laborer, in digging, brought to light a stone coffin, in the form of an angel, containing the remains of a human skeleton reduced to dust. Several articles of value were likewise in the coffin. M. Berryer, unfortunately, was not at once apprized of the discovery. But he succeeded in recovering a large bronze bowl, beautifully sculptured; the fragments of a silver basin, completely oxydized; a large chased gold ring, but wanting the stone which had been set in it (this was a work of the Lower Empire); a very large horn comb, richly ornamented; some broken glass vessels; and a coin of the realm of the Emperor Gratian. This coffin, discovered not far from a very ancient road, appears not to have been alone. M. Berryer has given orders to dig the ground all around, to discover whether it was not a burial-place of the last period of Roman dominion in Gaul.

——*La Monde Illustrée* has lately distinguished itself by a long and elaborate biographical article on "Comte de Beust," whose portrait it likewise furnished. Unfortunately, however, the contributor who intended to glorify the great Schleswig-Holstein saviour pitched upon another Beust, who happens to be a mineralogist at Freiberg. The funniest part of the story is that the biographer never once smells his rat, but goes on copying and mistranslating the sketch given of the latter in the "Zeitgenossen," until he comes to the great work of the Professor on "The Saxon Mines and the Finances of State," at which juncture he exclaims, "What a man! *Not only* great as a politician, he is also an eminent scholar in national economy!"

——The last accounts from Australia state that all the hopes which had been entertained of the naturalization of the Peruvian alpaca had been disappointed. Of the 300 introduced by Mr. Ledger from Peru, five years ago, and purchased by the government of New South Wales for £15,000, the whole have died off, and their progeny, numbering 330, are in an unhealthy condition. During a discussion on the subject in the Colonial Legislature, nearly every speaker was in favor of the government immediately getting rid of the cost of keeping them; and a resolution was adopted that they should be disposed of as soon as possible, either by auction or in any other way that might seem expedient.

EDUCATIONAL INTELLIGENCE.

Prof. J. Madison Watson, the well-known and popular author and elocutionist, will give class-drill at Teachers' Institutes, in Phonetics, Elocution, and School Gymnastics, during the approaching season. He has in preparation a new series of evening lectures and readings. His address is No. 51 John-street, New York.

——The report of the State Superintendent of schools in Kentucky, shows the number of districts having had schools

taught in them during the school year ending Dec. 31, 1863, to have been 3,212, an increase of 987 over the preceding year; the number of children between the ages of 6 and 18 years reported as residing within the bounds of these districts, was 224,318, an increase of 65,329; the highest number of schools, 112,757—an increase of 30,039; the lowest number, 36,516—an increase of 8,524; the average number, 73,306, an increase of 29,652. The amount apportioned by the State for school purposes was $298,075 80.

——The State Commissioner of Common Schools in Ohio, in his last report, lays down several points of improvement in the school-system of his State. The first one is worthy of mention, namely: "The introduction of graded schools, and the organization of central township schools, wherever practicable." On this topic we may enlarge some day.

——The report of the minister of Public Instruction in France, for 1863, shows that there are at present in the French empire, 82,135 primary schools, or 16,136 more than in 1848. There are 4,731,946 scholars in all, nearly a million more than in 1848, or a quarter of the whole. The 36,499 communes provided with means of instruction c mprise 41,426 public and free schools, special for boys, or mixed as to the sexes, of which 37,892, numbering 2,145,420 pupils, are directed by lay teachers; 3,531, numbering 982,008 pupils, are taught by ecclesiastics of the Roman Catholic Church. It is estimated that more than 600,000 children are without the means of education.

——The report of the committee of the English Privy Council on Education for the year 1863 has been published, from which it appears that the number of schools, or departments of schools, under separate teachers, actually inspected during the year, has increased, as compared with 1862, by 312, and the number of children by 35,315. The number of certificated teachers shows an increase of 503. The number of new school-houses built was 125. The inspectors visited 11,230 daily schools, and found present in them 1,692,741 children, 9,481 certificated teachers, and 13,849 apprentices. The female scholars were 45.08 per cent. of the whole number, being the highest percentage which they have yet reached. The inspectors also visited 40 separate training colleges, occupied by 3,109 students, and 179 schools for pauper children. With regard to the expenditure of the grant, it seems there was a net decrease last year of £53,351 6*s.* 7*d.*

The whole number of day-scholars in the elementary schools of England and Wales under the revised code is 870,560, and of Scotland 117,900. The whole number of night-scholars in Great Britain is computed at 40,000. The estimated sum expended by Parliament in the instruction of these numbers is £478,887.

SCHOOL-HOUSES ABROAD.

In England, just now, they are building a number of new school-houses, for the use of the national schools. They appear to be well-planned and substantially built. From our foreign files we extract notices of two, which are fair specimens of the general style of all.

Crowle (*Lincolnshire*).—The new schools recently erected in this parish have been opened. The plans and estimates were obtained from Mr. Hopkins, consulting architect to the Worcester Diocesan Society, and the contract for building sent in by Mr. Shelswell, of Worcester, was accepted. Accommodation is provided for upwards of 100 children, including infants. It is built of bricks, with Bath stone dressings, and alternate white and gray stone in the arches of the doors and windows. A band of ornamental brickwork surrounds the school part of the building, a residence for the master and mistress being at the western end, and the whole is inclosed in a brick and stone fence. The principal room is 42 feet long by 18 feet wide, with a steep-pitched roof of open timber, the principals resting upon stone corbels. In the east wall is a decorated window, and there are square-headed mullioned windows in the side wall. There is also a class-room, with lofty roof, and lighted by a three-light trefoil-headed window, and a cloak-

room, entrance-hall, and porched doorway. The entire cost was between £700 and £800.

Trecastle (*South Wales*).—A national school building has been erected here. The building comprises a room 51 feet long by 20 feet broad and 16 feet high, with a class-room 18 feet by 15 feet, of similar height, forming a wing at the east end. Over the entrance a tower is erected, which contains a clock and bell, supplied by Mr. R. Webb, Brecon. There is a house for the schoolmaster, and also a playground attached to the school.

NEW BOOKS.

BEYOND all doubt the Beecher family, male and female, have made by their literary productions, and their ceaseless discussion of the most exciting moral topics of the day, their mark in the current of society. Among them all it is probable that Miss Catherine E. Beecher, whose new work on the Religious Training of Children (1) has just been issued, will hold the more permanent reputation. With less genius than her brother and sister, she has more tact and good sense. Her dealing is with practical subjects. She discusses live events. In this book she takes up the subject in some respects originally, and treats it directly and philosophically. She is not without contradictions, however, unless her lack of clearness leads us into error; for though a convert to the Protestant Episcopal Church, she assails the doctrine of infant depravity, and ranges herself on the side of Pelagius. Certainly this is not warranted by the teachings of the fathers, the practice of the Church, nor the letter of the thirty-nine articles. Her views are worthy of consideration, are forcibly urged, and, whether we agree with or dissent from them, deserve attention. We recommend the book to the careful perusal of parents, who will find in it, apart from any doctrinal points, hints of value.

The works on surveying prepared for the use of schools have been generally treatises too abstruse for beginners, on the one hand, and too rudimentary for those further advanced, on the other. Mr. Bradbury has given us, as his title promised, a treatise on the Elements of Plane Trigonometry,(2) with its practical application. He does not attempt to teach the use of the theodolite, and ignores transits. He relies for the measurement of lines and the determination of angles upon less complex instruments; but so far as he goes he is thorough. The ordinary surveyor will, therefore, find in this work a convenient book of reference, as will the pupil a book of instruction. The examples are judiciously chosen, and well set forth; and the usual tables of logarithms, latitude and departure, natural sines, and natural tangents, which are appended, appear to be accurate in every respect.

The elementary treatises on arithmetic, being necessarily filled with rules and the explanation of principles, could not have a great many examples without swelling their size beyond that adapted to convenience. A work devoted to test exercises alone, to questions which the more advanced pupils already grounded in elementary principles would be called on to solve, was needed. The Arithmetical Examples, of Robinson, (3) supplies the want fairly. After an introduction giving thorough information upon weights and measures, money and currency, rates of interest, &c., it furnishes fourteen hundred and ninety-five arithmetical propositions, which are varied, and in character such as are most apt to be presented suddenly to pupils in their ordinary life. Scarcely any possible kind of arithmetical problem is neglected. It is certainly a very complete and well-arranged work.

A very neat little work, and highly useful, is the Scholar's Diary, of Mr. Strong. (4) Every pupil should be made to keep a record of passing events, however trivial in their nature. The exercise is one which combines instruction with amusement, and does a vast deal towards perfecting the school-boy or school-girl in composition. The instructions at the beginning are clear and concise.

The study of Geography is being shaped into a more perfect system, through the efforts of the leading geographers of the day. The result of this is the production of better text-books. Among these the works of War-

(1) RELIGIOUS TRAINING OF CHILDREN IN THE SCHOOL, THE FAMILY, AND THE CHURCH. By CATHERINE E. BEECHER. New York: Harper & Brothers. 16mo, pp. 413.

(2) THE ELEMENTS OF PLANE TRIGONOMETRY, and their application to the measurement of Heights and Distances, Surveying of land, and Levellings. By WILLIAM F. BRADBURY, A. M Boston: Taggard & Thompson. 12mo, pp. VII-112.

(3) ARITHMETICAL EXAMPLES: or Test Exercises for the use of advanced classes. New York: Ivison, Phinney, Blakeman & Co. 16mo, pp. 188.

(4) THE SCHOLAR'S DIARY; designed for the use of all who go to school. By EMORY F. STRONG. Schermerhorn, Bancroft & Co. *Paper*, 16 printed pp., 32 in MS.

ren, published by Cowperthwait & Co., are particularly worthy of notice. New editions of these lie upon our table, and have been carefully examined. "The Common-school Geography," (5) in point of accuracy, fullness, clearness of style, and felicity of illustration, leaves little to be desired. There are at times a relic of the old forms, especially in the definitions. These should be absolute. To call a river "a stream of fresh water which flows into the sea, or into some other body of water," does not distinguish it from a rivulet or brook. An explanation which is not distinctive, is no definition. The definitions given of a republic and of a monarchy are not perfectly correct. These blemishes are easily remedied, and the execution of the book is so satisfactory in other respects, that they are to be regarded as the exceptions, proving its general excellence. The "Physical Geography," (6) by the same author, is marked by a simple style, well-arranged matter, and the general aptness and excellence of its illustrations. The two books may be used with advantage in any grade of schools—in the lower and medium as elementary works, in the higher as means of a repetitive examination.

In her "Barbara's History," Miss Edwards made a hit. Modelled though some of its characters and situations were upon similar people and scenes in "Jane Eyre," it was vigorous in execution, and interesting as a narrative. "The Ladder of Life," by the same author, (7) is a previous work, and though inferior, in some respects, to "Barbara's History," has character, plot, and a well-told series of events to recommend it. The struggling musician is well drawn—particularly so; and the heroine in some of her naïve confessions makes us fancy that the author has been giving us some of her own secret history.

For the convenience of those who wish to introduce into schools and private families the practice of Calisthenics, the new, small, but complete manual on the subject, by Watson, (8) is well adapted. That Calisthenic exercises are fashionable, shows that Fashion, by way of counterbalance to her usual follies, occasionally does a sensible thing. The book itself is printed on heavy paper, in the finest style of the art, and is substantially bound. The illustrations are admirable.

A text-book on Chemistry, which shall bring us up with the latest discoveries, has been desirable. Those in current use belong to a past age, in the present steady advance of scientific knowledge. Professor Porter has endeavored to supply this want, (9) by a thorough revision and enlargement of his former work on the subject. A careful examination of the volume shows us that it has been prepared with all possible care, and notices all the newer discoveries. The language is clear, terse, and simple; the subject matter judiciously arranged; and the illustrations numerous and well-engraved. We can recommend Professor Porter's work as the nearest approach to a perfect treatise on the Elements of Chemistry.

Davies' University Arithmetic, (10) a new edition of which lies before us, is a standard work, whose relative position among books of the kind has been long defined. The new edition is well printed and neatly bound, and will be still approved by a large number of our best teachers, as the most proper text-book for advanced classes.

The series of instruction books by Marcius Willson, are advancing steadily toward completion. The Larger Speller (11) has been recently issued, and contains some improvements upon the older spelling-books, which make it worthy of additional favor. Mr. Willson classifies his words under the heads of the different parts of speech, and he groups the synonyms together, in connection with an example of the appropriate manner of using each. He improves somewhat upon the dictionaries in his defining lessons, but, like the dictionaries, he rarely gives definitions at all. To take his own illustration—the dictionary says:

COUN'SEL, *n.*, advice; opinions; an advocate.

Mr. Willson puts it,

COUN'SEL, *n.*, We gave him good *counsel* (advice). Let a man keep his own *counsel* (opinions; purposes). He was questioned by the plaintiff's *counsel* (advocate; lawyer).

We submit that there is no "definition" of the word in either case, though Mr. Willson's arrangement is a very useful one.

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(5) THE COMMON SCHOOL GEOGRAPHY; an Elementary Treatise on Mathematical, Physical, and Political Geography. By D. M. WARREN. Last Revised Edition. Philadelphia: H. Cowperthwait & Co. *Numerous maps.* 4to, pp. 100.

(6) A SYSTEM OF PHYSICAL GEOGRAPHY; containing a description of the Natural Features of the Land and Water, the Phenomena of the Atmosphere, and the Distribution of Animal and Vegetable Life. To which is added a Treatise on the Physical Geography of the United States. By D. M. WARREN. Revised Edition. Philadelphia; H. Cowperthwait & Co. *Numerous maps.* 4to, pp. 92.

(7) THE LADDER OF LIFE: a Heart History. By AMELIA B. EDWARDS. New York: Harper & Brothers. *Paper.* 8vo, pp. 112.

(8) WATSON'S MANUAL OF CALISTHENICS; a Systematic Drill-book without Apparatus, for Schools, Families, and Gymnasiums, with music to accompany the exercises. Illustrated from Original Designs. By J. MADISON WATSON. New York & Philadelphia: Schermerhorn, Bancroft & Co. 8vo, pp. 144.

(9) PRINCIPLES OF CHEMISTRY: embracing the most Recent Discoveries in the Science, and the Outlines of its Application to Agriculture and the Arts. By JOHN A. PORTER, M.A., M.D., Professor of Organic Chemistry in Yale College. New York: Barnes & Burr. 12mo, pp. 631.

(10) UNIVERSITY ARITHMETIC, embracing the Science of Numbers, and General Rules for their Application. By CHARLES DAVIES, LL.D. New York: Barnes & Burr. 12mo, pp. 454.

(11) WILLSON'S LARGER SPELLER: a Progressive Course of Lessons in Spelling, arranged according to the principles of Orthoepy and Grammar, with Exercises in Synonyms, for Reading, Spelling, and Writing, and a new system of Definitions. By MARCIUS WILLSON. New York: Harper & Brothers. *Boards.* 16mo, pp. 168.